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SHIP CLASSIFICATION

**GUIDELINES FOR STATUTORY
SURVEYS OF INLAND WATERWAY
SHIPS**

2015

PART SIX CARRIAGE OF DANGEROUS GOODS

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CHAPTER 1 GENERAL PRINCIPLES

Section 1 GENERAL PROVISIONS

1.1.1 Application

1.1.1.1 Unless expressly provided otherwise, this Part applies to inland waterways ships carrying explosive, inflammable, toxic and corrosive cargoes that need special protection due to easy to cause personal casualty, property damage and water pollution.

1.1.1.2 This Part does not apply to oil tankers, chemical tankers and liquefied gas carriers.

1.1.1.3 Vehicle-passenger ferries carrying dangerous cargoes are to meet the following requirements:

(1) Self-propelled vehicle-passenger ferries are to meet the requirements in CHAPTER 1 and CHAPTER of this Part;

(2) Vehicle-passenger ferries of combined pusher and barge type are to meet the requirements of CHAPTER 1, CHAPTER 2 and CHAPTER 4 of this Part.

1.1.2 Classification of dangerous cargoes

1.1.2.1 Dangerous goods are classified into the following 9 classes according to the dangerousness or major dangerousness in the Guidelines¹:

Class 1: Explosives

Class 1.1: substances and articles which have a mass explosion hazard;

Class 1.2: substances and articles which have a projection hazard but not a mass explosion hazard;

Class 1.3: substances and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard;

Class 1.4: substances and articles which present no significant hazard;

Class 1.5: very insensitive substances which have a mass explosion hazard;

Class 1.6: extremely insensitive articles which do not have a mass explosion hazard;

Class 2: Gases

Class 2.1: flammable gases;

Class 2.2: non-flammable, non-toxic gases;

Class 2.3: toxic gases.

Class 3: Flammable liquids

Class 4: Flammable solids; substances liable to spontaneous combustion; substances which, in contact with water, emit flammable gases

Class 4.1: flammable solids, self-reactive substances and desensitized explosives;

Class 4.2: substances liable to spontaneous combustion;

Class 4.3: substances which, in contact with water, emit flammable gases.

Class 5: Oxidizing substances and organic peroxides

Class 5.1: oxidizing substances;

Class 5.2: organic peroxides.

Class 6: Toxic and infectious substances

Class 6.1: toxic substances;

Class 6.2: infectious substances.

Class 7: Radioactive material

Class 8: Corrosive substances

Class 9: Miscellaneous dangerous substances and articles

1.1.3 Forbidden from transport

1.1.3.1 Unless expressly provided otherwise by the Administration, highly toxic chemicals are forbidden from transport in inland waterways.

1.1.3.2 Infectious substances of Class 6.2 are forbidden from transport in inland waterways.

1.1.3.3 Radioactive materials of Class 7 are forbidden from transport in inland waterways.

1.1.3.4 Substances that are forbidden from transport stipulated in Article 900 of CHAPTER 3.3 of International Maritime Dangerous Goods Code are forbidden from transport in inland waterways.

1.1.3.5 Explosives other than listed in CHAPTER 3.2 of International Maritime Dangerous Goods Code are forbidden from transport in inland waterways.

¹The classification of dangerous goods in the Regulations is the same with International Maritime Dangerous Goods Code.

CHAPTER 2 CARRIAGE OF DANGEROUS GOODS IN PACKAGE

Section 1 GENERAL PROVISIONS

2.1.1 General requirements

2.1.1.1 When cargo ships carry the packaged dangerous cargoes mentioned in 1.1.2 of CHAPTER 1 of this Part, the cargo spaces is to meet the applicable requirements in other parts of the Guidelines in addition to the provisions in this CHAPTER.

2.1.1.2 For ships carrying dangerous goods in package, the survival capability are to the requirements in CHAPTER 2 of PART FIVE.

2.1.1.3 The packing of dangerous goods is to meet the requirements of International Maritime Dangerous Goods Code.

2.1.1.4 The stowage of dangerous goods in package is to meet the requirements of International Maritime Dangerous Goods Code.

2.1.1.5 Ships are to be equipped with cargo stowage and securing manual according to the requirements of CECSISC Guidelines for Development of Storage and Securing Manual of Inland Waterway Ships Carrying Dangerous Goods in Package.

2.1.2 Types of ships and cargo spaces

2.1.2.1 The following type of ships and cargo spaces are applied to Table 2.1.2.1.

(1) Ships and cargo spaces that are not specifically designed to carry cargo containers, but are planned to carry dangerous goods in package, including dangerous in containers and movable cabinets;

(2) special container ships and cargo spaces that are used to carry dangerous goods in cargo containers and movable cabinets;

(3) ro-ro cargo spaces that are used to carry dangerous goods;

(4) ships and cargo spaces that carry dangerous goods (except bulk liquid and gas) in shipborne barges.

Table 2.1.2.1

Types of ships in 2.1.2.1 Applicable terms	Exposed deck, including (1) to (4)	(1) Not specially designed	(2) Container cargo spaces	(3)		(4) Shipborne barges
				Closed ro-ro cargo spaces	Open ro-ro cargo spaces	
2.2.1.1	×	×	×	×	×	×
2.2.1.2	×	×	×	×	×	—
2.2.1.3	—	×	×	×	×	×
2.2.1.4	—	×	×	×	×	×
2.2.2	—	×	×	×	×	× ⁴
2.2.3	—	×	×	×	—	× ⁴
2.2.4.1	—	×	× ¹	×	—	× ⁴
2.2.4.2	—	×	× ¹	×	—	× ⁴
2.2.5	×	×	×	×	×	—
2.2.6.1	×	×	×	×	×	—
2.2.6.2	×	×	×	×	×	—
2.2.7	×	×	—	—	×	—
2.2.8	×	×	× ²	×	×	—
2.2.9	—	—	—	× ³	×	—

Notes: 1. Solids of Class 1, Class 4 and Class 5.1 do not apply to closed cargo containers. For closed cargo containers loading liquid dangerous goods of Class 2, Class 3, Class 6.1, Class 4 and Class 5.1, the ventilation rate may be reduced to be not less than twice per hour. As for this requirements, a movable tank is a closed cargo container.

2. It only applies to decks.

3. It only applies to the closed ro-ro cargo spaces that cannot be sealed.

4. If barges can contain flammable vapours or can exhaust flammable vapours to safe spaces outside the carriage cabins

through the ventilating pipes connected with the barges, these requirements may be reduced or canceled upon the agreement of [CCSISC](#).

2.1.2.2 'X' in Table 2.1.2.1 indicates that the requirement applies to all categories of dangerous goods listed in the corresponding row of Table 2.1.2.2, excluding the notes.

Table 2.1.2.2

Type of cargo - Applicable terms	1.1 - 1.6	1.4s	2.1	2.2	2.3 Flammable ⁹	2.3 Non-flammable	3 Flash point ≤23 °C	3 Flash point ≤60 °C	4.1	4.2	4.3 Liquids ¹⁰	4.3 Solids	5.1	5.2	6.1 Liquids	6.1 Liquids ≤23 °C	6.1 Liquids >23 °C ≤60 °C	6.1 Soils	8 Liquids	8 Liquids ≤23 °C	8 Liquids >23 °C ≤60 °C	8 Soils	9
2.2.1.1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
2.2.1.2	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	—
2.2.1.3	x	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2.2.1.4	x	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2.2.2	x	—	x	—	x	—	x	—	—	—	x ⁷	—	—	—	—	x	—	—	—	x	—	—	x ⁶
2.2.3	x	x	x	x	—	x	x	x	x	x	x	x	—	x	x	x	x	x	x	x	x	x	—
2.2.4.1	—	—	x	—	—	x	x	—	x ¹	x ¹	x	x	x ¹	—	—	x	x	x ¹	—	x	x	—	x ¹
2.2.4.2	—	—	x	—	—	—	x	—	—	—	—	—	—	—	x	—	—	—	—	x	—	—	x ⁶
2.2.5	—	—	—	—	—	—	x	—	—	—	—	—	—	x	x	x	—	x ⁸	x	x ⁸	—	—	—
2.2.6	—	—	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x ⁴
2.2.7	—	—	—	—	—	—	x	x	x	x	x	x	—	—	x	x	—	—	—	x	x	—	—
2.2.8	x ²	—	x	x	x	x	x	x	x	x	x	x	x ³	x	—	x	x	—	—	x	x	—	—
2.2.9	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
2.2.10	x	x	x	x	x	x	x	x	x	x	x	x	x ⁵	x	x	x	x	x	x	x	x	x	x

- Notes: 1. Where the revised International Maritime Dangerous Goods Code requires 'spaces of mechanical ventilation'.
 2. Under any circumstances, the horizontal distance between the stowed cargoes and machinery space boundary is to not be less than 3m.
 3. Refer to the revised International Maritime Dangerous Goods Code.
 4. Where it applies to the carried cargoes.
 5. According to the stipulations in the revised International Maritime Dangerous Goods Code, dangerous goods of Class 5.2 are forbidden from being stowed under decks or closed ro-ro cargo spaces.
 6. It only applies to dangerous goods releasing flammable vapour listed in the revised International Maritime Dangerous Goods Code.
 7. It only applies to dangerous goods with a flashpoint below 23°C listed in the revised International Maritime Dangerous Goods Code.
 8. It only applies to the dangerous goods with risks of Class 6.1.
 9. According to the stipulations in the revised International Maritime Dangerous Goods Code, dangerous goods of Class 2.3 with risks of Class 2.1 are forbidden from being stowed under decks or closed ro-ro cargo spaces.
 10. According to the stipulations in the revised International Maritime Dangerous Goods Code, dangerous goods of Class 4.3 with a flashpoint below 23 °C are forbidden from being stowed under decks or closed ro-ro cargo spaces.

Section 2 SPECIAL REQUIREMENTS

2.2.1 Water supplies

2.2.1.1 Excluding the cargo ships (barges) with deadweight of less than 1000t, arrangements are to be made to ensure immediate availability of a supply of water from the fire main at the required pressure either by permanent pressurization or by suitably placed remote arrangements for the fire pumps.

2.2.1.2 The quantity of water delivered is to comply with the requirements for the nozzles sizes and water supplies specified in CHAPTER 3 of PART FIVE of the Guidelines, and is to be capable of being trained on any PART of the cargo space when empty.

2.2.1.3 Means are to be provided for effectively cooling the designated under-deck cargo space by plenty of water supplies either by a fixed arrangement of spraying nozzles or by flooding the cargo space with

water.Hoses may be used for this purpose in small cargo spaces and in small areas of larger cargo spaces. However, the drainage and pumping arrangements are to be such as to prevent the build-up of free surface in any case.If this is not possible, the adverse effect upon stability of the added weight and free surface of water is to be taken into account.

2.2.1.4 Provision to flood a designated under-deck cargo space with suitable specified media may be substituted for the requirements in 2.2.1.3 of this Section.

2.2.2 Sources of ignition

2.2.2.1 Electrical equipment of ships carrying the following dangerous goods are to meet the provisions of 2.2.2.3~2.2.2.15 of this Section:

- (1) Class 1 – explosives other than explosives of Class 1.4 in compatibility group s;
- (2) Class 2.1 – all flammable gases dissolved under compression, liquefaction or pressurization;
- (3) Class 3 – all flammable liquids with a flash point (closed cup test) less than 23°C;
- (4) Class 6.1 – all toxic substances with a flash point (closed cup test) less than 23°C;
- (5) Class 8 – all corrosive liquids with a flash point (closed cup test) less than 23°C.

2.2.2.2 The dangerous area caused by the dangerous goods mentioned in 2.2.2.1 of this Section can be divided into the following two types:

(1) areas or spaces that may produce explosive atmosphere under normal operation are called as dangerous areas;

(2) areas or spaces that are unlike to produce explosive atmosphere under normal operation and even the explosive atmosphere is produced, it is occasional and transitory, are called as expanded dangerous areas.

2.2.2.3 Only the electrical equipment that is necessary to ship safety and operation may be installed in the dangerous areas. The explosion-proof performance of electrical equipment installed and used on board is to be fit for the characteristics of the carried cargoes.

2.2.2.4 For the ships carrying explosives of Class 1 (excluding the explosives of Class 1.4 in compatibility group s), the following areas or spaces are dangerous areas:

- (1) Closed cargo spaces and closed or open ro-ro cargo spaces;
- (2) fixed containers (such as caisson).

2.2.2.5 Cables that meet the requirements of 2.2.2.11 of this Section, and electrical equipment that at least meet the requirements in Table 2.2.2.5 may be installed in the dangerous areas stipulated in 2.2.2.4 of this Section.

Table 2.2.2.5

Atmosphere	Electrical equipment			
	Type	Explosion-proof type	Temperature class or maximum surface temperature	Enclosure protection class
Explosive dust atmosphere	General electrical equipment	—	100°C	IP65
Explosive gas atmosphere	Intrinsically safe Ex 'i'	II A	T5	
	Flame-proof Ex 'd'	II A		
	Increased safety Ex 'e' (only applicable to lighting fixture)	II		
Combined explosive dust and explosive gas atmosphere	Intrinsically safe Ex 'i'	II A	T5	IP65
	Flame-proof Ex 'd'	II A		
	Increased safety Ex 'e' (only applicable to lighting fixture)	II		

2.2.2.6 For ships carrying flammable liquids with a flash point less than 23°C in Class 3 and flammable gases in Class 2.1,

the following areas or spaces are dangerous areas:

- (1) closed cargo spaces and closed ro-ro spaces;
- (2) ventilation ducts (if any) in dangerous areas;
- (3) exposed deck areas or semi-enclosed spaces above exposed decks that are within 1.5m of air outlets in dangerous areas;

(4) enclosed or semi-enclosed spaces with direct communications to the spaces mentioned in (1) and (2) and without appropriate measures to prevent flammable and explosive gas from entering the spaces.

The following areas or spaces are expanded dangerous areas:

(1) spaces separated with the dangerous spaces mentioned in (1) and (2) with self-closing air-tight door (watertight doors may be deemed as air tight) and with natural ventilation;

- (2) the interior of dampers (if any) that are adjacent to the aforementioned dangerous areas;
(3) open or semi-enclosed spaces within 1.5m outside the aforementioned dangerous areas (3).

2.2.2.7 Cables that meet the requirements of 2.2.2.11 of this Section, and electrical equipment that at least meet the requirements in Table 2.2.2.7 may be installed in the dangerous areas stipulated in 2.2.2.6 of this Section.

Table 2.2.2.7

Atmosphere	Electrical equipment		
	Type	Explosion-proof type	Temperature class or maximum surface temperature
Dangerous areas	Intrinsically safe Ex 'i'	II C	T4
	Flame-proof Ex 'd'	II C	
	Positive pressure Ex 'p'	II	
	Encapsulated Ex 'm'	II	
Expanded dangerous areas	Equipment that are allowed to be installed in the aforementioned dangerous areas	II C or II	T4
	Non-sparking Ex 'n'	II	
	Equipment does not generate spark or electric arc under normal operation		135°C

2.2.2.8 If spaces with direct communications to the adjacent dangerous areas (e.g. dangerous area (4) stipulated in 2.2.2.6 of this Section) are protected by the positive pressure stipulated in the accepted standard (refer to IEC60092-506 publication Special features – Ships carrying specific dangerous goods and materials hazardous only in bulk), they can be deemed as non-dangerous spaces.

2.2.2.9 If there are dampers adjacent to the dangerous areas listed in 2.2.2.6, the external spaces with natural ventilation adjacent to dampers may be deemed as non-dangerous areas.

2.2.2.10 If the installed electrical equipment is not suitable to be used in the areas with explosive dangers, the electrical equipment are to be disconnected and have protection against unapproved reconnection. The disconnection is to be performed outside the dangerous areas and is to be executed with disconnecting switch or lock switch.

2.2.2.11 Cables are to be armoured or with braided shielding layer or laid in metallic conduit, excluding those in expanded dangerous areas.

2.2.2.12 Cargo spaces are to avoid cable joints as much as possible. If it is impossible, such joints are to be enclosed in junction boxes made of explosion-proof metals or high-strength plastics, or be sealed in corrugated pipes.

2.2.2.13 Except the expanded dangerous areas, cable penetration on decks and bulkheads is to be sealed in order to prevent flammable gases or vapours from passing.

2.2.2.14 Portable electrical equipment that must be used in the dangerous areas for ship operation, are to be the qualified electric apparatus for explosive atmospheres. Except intrinsically safe circuits, such electrical equipment are to be fitted with self supplied power source.

2.2.2.15 If the details of cargoes planned to carry are not obtained or ships plan to carry all cargoes specified in 2.2.2.1 of this Section, the electrical equipment installed in the dangerous areas are to meet the following requirements:

- Enclosure protection class IP65
- Maximum surface temperature 85°C
- explosion-proof type II C
- Temperature class T6

2.2.3 Detection systems

2.2.3.1 Closed cargo spaces, including closed ro-ro cargo spaces, are to be fitted with a fixed fire detection and fire alarm system complying with the requirements of CHAPTER 3 of PART FIVE of the Guidelines.

2.2.4 Ventilation

2.2.4.1 Adequate power ventilation is to be provided in closed cargo spaces. The arrangement is to be such as to provide for at least six air changes per hour in the cargo spaces, based on any empty cargo space, and for removal of vapours from the upper or lower parts of the cargo space, as appropriate.

2.2.4.2 The fans are to be such as to avoid the possibility of ignition of flammable gas/air mixtures. Suitable wire mesh guards are to be fitted over inlet and outlet ventilation openings.

2.2.5 Bilge pumping

2.2.5.1 Where it is intended to carry liquid dangerous goods in cargo spaces, the bilge pumping system is to be designed to protect against inadvertent pumping of such liquids through machinery space piping or pumps, and is to comply with the relevant requirements of CHAPTER 4 of PART SEVEN of the Guidelines.

2.2.6 Personnel protection

2.2.6.1 Two sets of full protective clothing, resistant to chemical attack, are to be provided for the cargo ships with deadweight of 1000t or over. The protective clothing is to cover all skin, so that no part of the body is unprotected.

2.2.6.2 At least two self-contained breathing apparatuses are to be provided for the cargo ships with deadweight of 1000t or over.

2.2.6.3 Appropriate protective clothing resistant to chemical attack and self-contained breathing apparatuses is to be provided for the cargo ships with deadweight of less than 1000t on the basis of the categories of the dangerous goods carried and navigating periods of the ship.

2.2.7 Portable fire extinguishers

2.2.7.1 Portable fire extinguishers with a total capacity of at least 12kg of dry powder of equivalent are to be provided for the cargo spaces. These extinguishers are to be supplemented to any portable fire extinguishers required elsewhere in CHAPTER 3 of PART FIVE.

2.2.8 Insulation of machinery space boundaries

2.2.8.1 Bulkheads forming boundaries between cargo spaces and machinery spaces are to be insulated to "A-60" class standard, unless the dangerous goods are stowed at least 3m horizontally away from such bulkheads, and protected construction are to be provided for the goods. Other boundaries between such spaces are to be insulated to "A-60" class standard.

2.2.9 Water-spray systems

2.2.9.1 Each closed cargo space is to be fitted with a fixed water-spraying system for manual operation or other fixed fire-extinguishing system. Each open ro-ro cargo space having a deck above it and each space not capable of being sealed are to be fitted with a spraying gun to protect all parts of any deck and vehicle platform (if any) in the space, except that the Administration may permit the use of any other fixed fire-extinguishing system that has been shown by full-scale test to be no less effective. However, the drainage and pumping arrangements are to be such as to prevent the build-up of free surfaces. If this is not possible, the adverse effect upon stability of the added weight and free surface of water is to be taken into account.

2.2.10 Divisions of ro-ro spaces

2.2.10.1 For ships having a ro-ro cargo space, a separation is to be provided between a closed ro-ro cargo space and an adjacent open ro-ro cargo space. The separation is to be such as to minimize the passage of dangerous vapours and liquids between such spaces. Alternatively, such separation need not be provided if the ro-ro cargo space is considered to be a closed cargo space over its entire length and fully complies with the relevant requirements of this Section.

2.2.10.2 For ships having a ro-ro cargo space, a separation is to be provided between a closed ro-ro cargo space and the adjacent weather deck. The separation is to be such as to minimize the passage of dangerous vapours and liquids between such spaces. Alternatively, a separation need not be provided if the arrangements of the closed ro-ro spaces are in accordance with those required for the dangerous goods carried on adjacent weather decks.

CHAPTER 3 CARRIAGE OF SOLID DANGEROUS GOODS IN BULK

Section 1 GENERAL PROVISIONS

3.1.1 General requirements

3.1.1.1 When cargo ships carry solid dangerous cargoes in bulk mentioned in 1.1.2 of CHAPTER 1 of this Part, the cargo spaces are to meet the applicable requirements in other PARTs of the Guidelines in addition to the provisions in this CHAPTER.

3.1.1.2 Unless expressly provided otherwise, this Chapter applies to ships and cargo spaces carrying solid dangerous cargoes in bulk in inland waterways.

3.1.1.3 For ships carrying solid dangerous cargoes in bulk, the survival capability is to the requirements of CHAPTER 2 of PART FIVE of the Guidelines.

3.1.1.4 The ships and cargo spaces carrying different types of solid dangerous cargoes in bulk are to meet the requirements in Table 3.1.1.4.

Table 3.1.1.4

Types of goods Applicable terms	4.1	4.2	4.3 ¹	5.1	6.1	8	9
3.2.1.1	×	×	—	×	—	—	×
3.2.1.2	×	×	—	×	—	—	×
3.2.2	×	× ²	×	× ³	—	—	× ³
3.2.3.1	—	× ²	×	—	—	—	—
3.2.3.2	× ⁴	× ²	×	× ^{2, 4}	—	—	× ^{2, 4}
3.2.3.3	×	×	×	×	×	×	×
3.2.4	×	×	×	×	×	×	×
3.2.5	×	×	×	× ²	—	—	× ⁵

Notes: 1. The hazards of substances in this class which may be carried in bulk are such that special consideration are to be given by the Administration to the construction and equipment of the ship involved in addition to meeting the requirements enumerated in this table.

2. Only applicable to Seedcake containing solvent extractions, to Ammonium nitrate and to Ammonium nitrate fertilizers.

3. Only applicable to Ammonium nitrate and to Ammonium nitrate fertilizers. However, a degree of protection in accordance with standard contained in the International Electrotechnical Commission publication No. 60079, Electrical Apparatus for Explosive Gas Atmospheres or its equivalent GB3836 Electrical Apparatus for Explosive Gas Atmospheres of National Standard of PRC is sufficient.

4. Only suitable wire mesh guards are required.

5. The requirements of International Maritime Solid Bulk Cargoes Code are sufficient.

Section 2 SPECIAL REQUIREMENTS

3.2.1 Water supplies

3.2.1.1 Excluding the cargo ships (barges) with deadweight of less than 1000t, arrangements are to be made to ensure immediate availability of a supply of water from the fire main at the required pressure either by permanent pressurization or by suitably placed remote arrangements for the fire pumps.

3.2.1.2 The quantity of water delivered is to comply with the requirements for the nozzles sizes and water supplies specified in CHAPTER 3 of PART FIVE of the Guidelines, and are to be capable of being trained on any part of the cargo space when empty.

3.2.2 Sources of ignition

3.2.2.1 Electrical equipment of ships carrying the following dangerous goods are to meet the provisions of 3.2.2.3~3.2.2.15 of this Section:

(1) Class 4.1 – flammable solids;

(2) Class 4.2 – substances liable to spontaneous combustion;

(3) Class 4.3 - substances which, in contact with water, emit flammable gases;

(4) Class 5.1 - oxidizing substances;

(5) Class 9 - miscellaneous dangerous substances and any other substance which has been verified or may be verified to be dangerous are to apply to the provisions for dangerous goods;

(6) MHB – substances that are dangerous when carried in bulk require special measures.

3.2.2.2 Areas or spaces carrying dangerous goods mentioned in 3.2.2.1 of this Section that may produce explosive atmosphere under normal operation are called as dangerous areas. Only the electrical equipment that is necessary to ship safety and operation may be installed in the dangerous areas. The explosion-proof performance of the installed and used electrical equipment is to be fit for the characteristics of the carried cargoes.

3.2.2.3 For ships carrying solid dangerous goods that may only produce explosive dust atmospheres, the following areas or spaces are dangerous areas:

- (1) closed cargo spaces;
- (2) ventilation ducts (if any) in dangerous areas;
- (3) enclosed spaces with direct communications to the spaces mentioned in (1) or (2) and without appropriate measures to prevent flammable dust from entering the spaces.

3.2.2.4 Cables that meet the requirements of 3.2.2.12 of this Section, and electrical equipment that at least meet the following requirements may be installed in the dangerous areas stipulated in 3.2.2.3 of this Section:

- (1) General electrical equipment
 - Enclosure protection class IP65
 - Maximum surface temperature 200°C; or
- (2) qualified electric equipment for explosive atmospheres
 - Enclosure protection class IP55
 - explosion-proof type II C
 - Temperature class T3

3.2.2.5 If the carried dangerous goods require surface temperature lower than that stipulated in 3.2.2.4 of this Section, the requirements for such goods are to be met (see 3.2.2.10 of this Section).

3.2.2.6 For ships only carrying solid dangerous goods in bulk (including solid dangerous goods that may produce explosive gas atmosphere) and MHB, the following areas or spaces are dangerous areas:

- (1) closed cargo spaces;
- (2) ventilation ducts (if any) in dangerous areas;
- (3) exposed deck areas or semi-enclosed spaces above exposed decks that are within 1.5m of air outlets in dangerous areas;
- (4) enclosed spaces with direct communications to the spaces mentioned in (1) or (2) and without appropriate measures to prevent flammable dust from entering the spaces.

The following areas or spaces are expanded dangerous areas:

- (1) spaces separated with the aforementioned dangerous spaces (1) or (2) with self-closing air-tight door (watertight doors may be deemed as air tight) and with natural ventilation;
- (2) the interior of dampers (if any) that are adjacent to the aforementioned dangerous areas;
- (3) open or semi-enclosed spaces within 1.5m outside the aforementioned dangerous areas (3).

3.2.2.7 The types of cables and electrical equipment that can be installed in the dangerous areas stipulated in 3.2.2.6 of this Section are to meet the stipulations specified in 3.2.2.4 of this Section and 2.2.2.7 of CHAPTER 2 of this Part as well as the minimum requirements shown in Table 3.2.2.7.

Table 3.2.2.7

Dangerous goods	IMO classification	Major risks	Dust explosion proof	Gas explosion proof	
			Enclosure protection class	Explosion-proof type	Temperature class
Aluminium pellet	MHB	H ₂	—	II C	T2
Ferro-silico aluminium powder	4.3	H ₂	—	II C	T2
Uncoated aluminium silicon powder	4.3	H ₂	—	II C	T2
Ammonium nitrate fertilizers - type A - type B	5.1 9	② ②	—	— —	
Coal	MHB	Dusts and methane	IP55	II A	T4
Direct reduced iron	MHB	H ₂	—	II C	T2
Ferrophosphorus (no mass)	MHB	H ₂	—	II C	T1
T3 ferrosilicon	4.3	H ₂	—	II C	T1
Scrap iron oxide Scrap sponge iron	4.2	Dusts	IP55	II A	T2

Dusts (For instace, produced by grains)	4.2	Dusts	IP55	—	—
Squeezed cake containing aromatic plant seeds	4.2	Haxane	—	II A	T3
Silicomanganese	MHB	H ₂	—	II C	T1
Sulphur	4.1	Flammable	IP55	—	T4
Zinc residues Zinc pellet Scrap zinc Zinc dross	4.3	H ₂	—	II C	T2

Notes: (1) 'Danger' here means the explosion danger caused by dangerous goods and electrical equipment.

(2) All circuits that are terminated at the cargo spaces are to be disconnected according to the requirements in 3.2.2.8.

3.2.2.8 For certain dangerous goods in Class 5.1 and Class 9, all circuits that are terminated at the cargo spaces are to be disconnected according to the requirements in 3.2.2.11 of this Section (see Table 3.2.2.7).

3.2.2.9 If spaces with direct communications to the adjacent dangerous areas are protected by the positive pressure stipulated Special features – Ships carrying specific dangerous goods and materials hazardous only in bulk (IEC60092-506 publication), they can be deemed as non-dangerous spaces.

3.2.2.10 If the details of cargoes planned to carry are not obtained or ships plan to carry all cargoes specified in 3.2.2.6 of this Section the electrical equipment installed in the dangerous areas are to meet the following requirements:

- Enclosure protection class IP65
- Maximum surface temperature 85 °C
- Explosion-proof type II C
- Temperature class T6

3.2.2.11 If the installed electrical equipment is not suitable to be used in the areas with explosive dangers, the electrical equipment are to be disconnected and have protection against unapproved reconnection. The disconnection is to be performed outside the dangerous areas and is to be executed with disconnecting switch or lockable switch.

3.2.2.12 Cables are to be armoured or with braided shielding layer or laid in metallic conduit, excluding those in expanded dangerous areas.

3.2.2.13 Cargo spaces are to avoid cable joints as much as possible. If it is impossible, such joints are to be enclosed in junction boxes made of explosion-proof metals or high-strength plastics, or be sealed in corrugated pipes.

3.2.2.14 Except the expanded dangerous areas, cable penetration on decks and bulkheads is to be sealed in order to prevent flammable gases or vapours from passing.

3.2.2.15 Portable electrical equipment that must be used in the dangerous areas for ship operation, are to be the qualified electric apparatus for explosive atmospheres. Except intrinsically safe circuits, such electrical equipment are to be fitted with self supplied power source.

3.2.3 Ventilation

3.2.3.1 Natural ventilation is to be provided in close cargo spaces where there is no mechanical ventilation.

3.2.4 Personnel protection

3.2.4.1 Two sets of full protective clothing, resistant to chemical attack, are to be provided for the cargo ships with deadweight of 1000t or over. The protective clothing is to cover all skin, so that no part of the body is unprotected.

3.2.4.2 At least two self-contained breathing apparatuses are to be provided for the cargo ships with deadweight of 1000t or over.

3.2.4.3 Appropriate protective clothing resistant to chemical attack and self-contained breathing apparatuses is to be provided for the cargo ships with deadweight of less than 1000t on the basis of the categories of the dangerous goods carried and navigating periods of the ship.

3.2.5 Insulation of machinery space boundaries

3.2.5.1 Bulkheads forming boundaries between cargo spaces and machinery spaces are to be insulated to "A-60" class standard, unless the dangerous goods are stowed at least 3m horizontally away from such bulkheads, and protected construction are to be provided for the goods. Other boundaries between such spaces are to be insulated to "A-60" class standard.

CHAPTER 4 PUSHERS (BUGS) OF BARGES CARRYING DANGEROUS GOODS

Section 1 GENERAL PROVISIONS

4.1.1 General requirements

4.1.1.1 Unless expressly provided otherwise, this Chapter applies to pushers (tugs) of barges carrying dangerous goods mentioned in 1.1.2 of CHAPTER 1 of this Part.

4.1.1.2 Pushers (tugs) of barges pushing (towing) dangerous goods are to meet the applicable requirements in other parts of the Guidelines in addition to the provisions in this CHAPTER.

4.1.1.3 If the barges carrying dangerous goods cannot comply with the requirements specified in 2.2.1 of or/and 3.2.1 of this Part, the fire water is to be supplied by their pushers (tugs) in accordance with the requirements in specified 2.2.1 or/and 3.2.1 of this Part.

4.1.1.4 The water fire-extinguishing system and fire equipments of pushers (tugs) are to be kept in good conditions, and be capable of being put into service immediately.

4.1.1.5 Provisions are to be made for the towing cables and mooring cables of pushers (tugs), used for formatting or disbanding the fleet, to prevent from damaging the enclosed apparatuses for the goods.

Section 2 ADDITIONAL REQUIREMENTS FOR PUSHERS (TUGS) OF BARGES PUSHING (TOWING) DANGEROUS GOODS WITH FLASH POINT LESS THAN 60°C

4.2.1 General requirements

4.2.1.1 Superstructures and deckhouses on pushers (tugs) are to be of fully enclosed constructions of steel or other equivalent materials. Doors and windows thereof are to be of a free gastight type. Living spaces are to be fitted with air conditioners.

4.2.1.2 For pushers (tugs) not complying with the requirements of 4.2.1.1 of this Section, the doors and windows on the bulkheads facing fore of the ship or of rooms on freeboard deck are to be of a free gastight type. Segregated smoking rooms or other rooms employed as smoking rooms concurrently are to be arranged on pushers (tugs), and their doors and windows facing outboard are to be of a free gastight type.

4.2.1.3 Cabins are to not be positioned below the freeboard deck of pushers (tugs) normally. Where any cabins are so positioned, they are to be provided with efficient ventilation.

4.2.1.4 Air inlets of cabin ventilating systems on pushers (tugs) are to be rationally arranged to reduce the drawing of oil vapour.

4.2.1.5 Exhaust ducts of main and auxiliary engines and boilers (if any) of pushers (tugs) are to be fitted with effective spark arresters approved by **CCS/ISC**.

4.2.1.6 Bulkheads and decks separating the galley and adjacent cabins are to be of 'A-0' class divisions. Deck coverings within the galley are to be of non-combustible material approved. Exhaust ducts from galley are to be fitted with effective spark arresters.